

WHAT IS CLAIMED IS:

- 1 1. A structure for steering light, comprising:
2 a base layer;
3 a first conductive layer overlying a portion of said base layer;
4 a flexure assembly, with a portion of said flexure assembly
5 comprising an I-beam, said flexure assembly overlying a portion of said first conductive
6 layer; and
7 a beam layer overlying and coupled to said flexure assembly, said
8 beam layer adapted to rotate relative to said base layer.
- 1 2. The structure as in claim 1 wherein said base layer comprises a
2 non-conductive material.
- 1 3. The structure as in claim 1 further comprising a second conductive
2 layer overlying a portion of said first conductive layer, said first conductive layer
3 comprising a greater surface area than said second conductive layer.
- 1 4. The structure as in claim 1 wherein a portion of underlying edges
2 of said flexure assembly and said beam layer are adapted to contact said base layer upon
3 rotation of said beam layer.
- 1 5. The structure as in claim 3 wherein said first and second
2 conductive layers comprise polysilicon.
- 1 6. The structure as in claim 1 wherein said beam layer comprises an
2 electrically conductive material, said beam layer being electrically isolated from at least
3 portions of said first conductive layer.
- 1 7. The structure as in claim 1 wherein said flexure assembly
2 comprises a torsion beam having first and second generally parallel arms each coupled to
3 a central beam that is generally orthogonal to said first and second arms.
- 1 8. The structure as in claim 7 wherein said first and second arms are
2 coupled to said beam layer.

1 9. The structure as in claim 3 wherein said first conductive layer and
2 said second conductive layer each have a central portion separate from a remaining
3 portion of the respective conductive layers, said central portions coupled together.

1 10. The structure as in claim 9 wherein said flexure assembly
2 comprises a central portion that is coupled to said second conductive layer central portion.

1 11. The structure as in claim 3 further comprising a third conductive
2 layer overlying a portion of said second conductive layer, said third conductive layer
3 having a smaller surface area than said second conductive layer.

1 12. The structure as in claim 11 wherein said first, second and third
2 conductive layers have at least portions thereof electrically coupled together, said
3 electrically coupled portions adapted to operate together as a single electrode.

1 13. The structure as in claim 11 wherein said first, second and third
2 conductive layers are in separate planes.

1 14. The structure as in claim 1 wherein said underlying edges of said
2 flexure assembly and said beam layer are configured to simultaneously contact said base
3 layer upon rotation of said beam layer.

1 15. The structure as in claim 4 wherein said beam layer comprises a
2 substantially planar upper surface when said underlying edges are in contact with said
3 base layer.

1 16. An apparatus for steering light, said apparatus comprising:
2 a base layer;
3 a first conductive layer overlying said base layer;
4 a second conductive layer in a separate plane from said first
5 conductive layer, each of said conductive layers comprising at least a portion thereof that
6 is electrically coupled to at least a portion of said other conductive layer; and
7 a beam layer coupled to a rotation device, said rotation device
8 positioned between at least one of said conductive layers and said beam layer;
9 wherein said rotation device and beam layer rotate in response to a
10 voltage applied to said coupled portions of said first and second conductive layers.

1 17. The apparatus as in claim 16 further comprising a third conductive
2 layer, wherein each of said first, second and third conductive layers are in a separate
3 plane from the other two conductive layers, and each of said conductive layers comprise
4 at least a portion thereof that is electrically coupled to at least a portion of said other two
5 conductive layers.

1 18. The apparatus as in claim 16, wherein an underlying edge of said
2 beam layer is adapted to contact said base layer at a first location when a first voltage is
3 applied to said electrically coupled conductive layer portions, and to contact said base
4 layer at a second location when a second voltage is applied to said electrically coupled
5 conductive layer portions.

1 19. The apparatus as in claim 16 wherein said rotation device and said
2 beam layer further comprise underlying edges which are adapted to contact said base
3 layer when said voltage is applied to said electrically coupled conductive layer portions.

1 20. The apparatus as in claim 16 wherein said rotation device
2 comprises a torsion beam, said torsion beam underlying said beam layer and having at
3 least a portion thereof comprising an I-beam.

1 21. The apparatus as in claim 16 wherein said first conductive layer
2 coupled portion has a larger surface area than a surface area of said second conductive
3 layer coupled portion.

1 22. The apparatus as in claim 17 wherein said second conductive layer
2 coupled portion has a larger surface area than a surface area of said third conductive layer
3 coupled portion.

1 23. The apparatus as in claim 22 wherein said rotation device is
2 coupled to said second conductive layer, said third conductive layer being disposed
3 between said second conductive and said beam layer.

1 24. A method of making an apparatus for steering light, said method
2 comprising:
3 providing a base layer having a first portion and a second portion;

4 forming first and second stacked electrodes on said first portion
5 and said second portion, said stacked electrodes on said first portion electrically isolated
6 from said stacked electrodes on said second portion;

7 forming a flexure assembly coupled to said base layer and
8 electrically isolated from said first and second stacked electrodes; and

9 forming a beam layer coupled to said flexure assembly.

1 25. The method as in claim 24 wherein said flexure assembly
2 comprises an I-beam configuration.

1 26. The method as in claim 24 wherein said first stacked electrode is
2 formed overlying said base layer and said second stacked electrode is formed overlying
3 said first stacked electrode, said first stacked electrode comprising a greater surface area
4 than said a second stacked electrode surface area.

1 27. The method as in claim 26 further comprising forming a third
2 stacked electrode overlying said second stacked electrode, said third stacked electrode
3 comprising a greater surface area than said second stacked electrode surface area.

1 28. A method of steering light, comprising:
2 providing the structure for steering light as provided in claim 3;
3 applying a voltage to said first and second conductive layers to
4 rotate said beam layer to a desired position, said beam layer having a substantially planar
5 upper surface when in said desired position; and
6 directing a light at said beam layer.